DOCUMENT RESUME

ED 455 813 IR 020 769

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TITLE	Distance Learning and Disability Access: A Success.
PUB DATE	2000-10-00
NOTE	6p.; In: Annual Proceedings of Selected Research and Development Papers Presented at the National Convention of the Association for Educational Communications and Technology (23rd, Denver, CO, October 25-28, 2000). Volumes 1-2; see IR 020 712.
PUB TYPE	Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Access to Education; *Assistive Devices (for Disabled); *Blindness; Disabilities; *Distance Education; Educational Needs; Graduate Study; Higher Education; Masters Degrees; *Masters Programs; Special Needs Students; *Teacher Education; Training; *Visual Impairments

ABSTRACT

While students who are blind and visually impaired represent less than one-half of one percent of the school age population, they are a group of students with multiple and often complex educational needs. One of these needs is for a specialized teacher trained in the methodologies of blindness and the adaptations necessary to facilitate access to the general education curriculum. This paper describes a three-year grant project at the University of Northern Colorado to design and deliver a graduate master's degree program in blindness and visual impairment to the 14-state region of the Western Interstate Commission on Higher Education (WICHE). The project, funded by the U.S. Department of Education, began in January 1998, and currently offers courses to 78 students working to complete 17 to 62 semester hours of coursework (depending on previous training and experience). Additional funds have been contributed by private and state sources. Students are geographically distributed across 18 states, over half of them in states without personnel or preparation programs in blindness and visual impairment. Fourteen courses have been converted for distance delivery as part of the project. In the fall of 2000, eight courses were delivered with a total of 86 students registered. A particular challenge of this project has been to provide a quality graduate education experience for practicing educators who cannot leave the special needs populations that they currently serve to re-tool for this area of specialization. Discussion includes the project description, design and development issues, the delivery systems and media used, lessons learned, and future directions. (AEF)

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DISTANCE LEARNING AND DISABILITY ACCESS: A SUCCESS

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This paper describes a three year grant project (Federal Grant #H029A70113) at the University of Northern Colorado to design and deliver a graduate master's degree program in blindness and visual impairment to the 14-state region of the Western Interstate Commission on Higher Education (WICHE). The project, funded by the US Department of Education, began in January of 1998. The $1.1 M grant project currently offers courses to 78 students working to complete 17 to 62 semester hours of coursework (depending on previous training and experience). Additional funds have been contributed by private and state sources. These students are geographically distributed across 18 of the United States, over half of them in states without personnel preparation programs in blindness and visual impairment. The first classes were delivered in the fall of 1998. Fourteen courses have been converted for distance delivery as part of this project. In the fall of 2000, eight courses were delivered with a total of 86 students registered.

While students who are blind and visually impaired (BVI) represent less than one-half of one percent of the school age population, they are a group of students with multiple and often complex educational needs. One of these needs is for a specialized teacher trained in the methodologies of blindness and the adaptations necessary to facilitate access to the general education curriculum. Rural school districts do not easily meet the needs of these students, in part because of the cost of hiring these specialized teachers, and in part because qualified teachers of students with visual impairments are in short supply. The shortage grows yearly (Ingersoll, 1999), as universities close teacher preparation programs that require significant investments in fiscal and human resources without producing equivalent tuition revenues.

Less than 400 new professionals in blindness and visual impairment enter the field annually (Ferrell, 1999). The teacher shortage in blindness has become so severe that the Office of Special Education Programs funded a special project to investigate the depth of the problem and to develop a national plan for meeting the personnel needs of the future. Although the results of this project have not yet been published, it appears that the nation's capacity to prepare specialized teachers is sorely stretched. Using technology to train teachers at a distance, especially in those states that do not have teacher training programs in blindness, is one way of expanding the nation's capacity while permitting students to remain in their current jobs in their home communities. For rural school districts, this may be the only way they will ever recruit a specialized teacher for their children with visual impairments. A particular challenge of this project has been to provide a quality graduate education experience for practicing educators who cannot leave the special needs populations that they currently serve to re-tool for this area of specialization.

Project Description

At the culmination of the three-year funding, this project has increased the graduate admissions to the Master's program at the University of Northern Colorado (UNC) over five-fold. Graduates of the program each year now outnumber the previous cumulative graduation total for a four-year period. Seven faculty have participated in the re-design and delivery of their courses using eight different distance technologies and media. Students who are themselves BVI are participating and we have recently added an instructor who is blind and teaching from a remote state.

The BVI faculty at the UNC have a deeply held philosophy about this severe needs program. It was agreed early on that the distance delivered program would subscribe to the same philosophy and that has influenced many design and implementation decisions. The philosophy statement is:

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"The UNC Severe Needs: Vision program is based on a firm and continuing commitment to the rights of all students with visual and other disabilities to receive equal educational opportunities, including equal access to the curriculum. The faculty believes that each learner should be provided educational opportunities that maximize potential for whatever level of independence is possible in order to be productive in society and to live a meaningful and fulfilling life."

This philosophy has become a guiding one in design and development decisions related to meeting the needs of our BVI students. The concept of providing "separate, but equal" access is completely contrary to this project. While it may be more difficult for the person without sight to take advantage of today's visual distance environments, this project demonstrates that there are many strategies that can be incorporated within distance learning environments to leverage the communication potential of these delivery technologies (see "Building Websites for the Blind: A Primer" in these Proceedings). A focus on collaboration, sharing, and contextualized experiences allows not just "teaching-by-telling, but learning-by doing" (Stanard, 1999, p. 49).

This project is one example of Molly Broad's comments about virtual learning, or the "fundamental importance of high-quality faculty and effective interaction, both between faculty and students and among students. Faculty rightly believe these are fundamental to good education; however, with the growing array of technology tools, it is possible to achieve those objectives online. In addition, virtual learning can also bring a very rich array of academic resources to the learning process--resources that address the multiple learning styles of students, and resources that greatly enrich the educational materials available to students" (Morrison, 1998, p. 3).

The project team consists of a Project Director and Project Coordinator who have served (along with other special education faculty) as subject matter experts, a faculty member from educational technology who has served as the primary instructional design and distance delivery consultant, and multiple graduate students from educational technology who have served as designers, developers, technical assistants, professional development coordinators, and as remote student support staff. Adequate investment in both human and technical resources is one reason the project has been successful. Enrollments are now stable enough to sustain the delivery of the distance program without additional grant funding.

The delivery of the degree program is grounded in a robust web environment that offers content, additional resources, and student support tools. Every course includes a website, threaded discussion, class listserv, and synchronous chat. Other customized components of courses include web-based interactive quizzes, case studies, multimedia tutorials, customized videotapes, and links to multiple special needs organizations. In addition, there is a web-based virtual university center (listserv, synchronous chat, bulletin board) for the students to use for communication and collaborative projects, and a threaded discussion area specifically for faculty involved in distance education efforts. The development of a sense of community for these learners and faculty has been the recent focus of project refinement and elaboration efforts through scaffolding communication and creating a sense of place for remote learners.

Design and Development Issues

Instructional design (ID) issues that have influenced the project cut across a broad range.

- alignment of course content with four sets of professional standards
- special education faculty review of course objectives for overlap and update
- introduction/implementation of the ID process (generically: ADDIE for analysis, design, development, implementation, evaluation) with special education faculty
- helping discipline faculty in their reconceptualization and adaptation of traditional instructional strategies
- delivery system and media selection that are compatible with the adaptive technologies used by BVI learners (e.g., screen readers, braille keyboards) and content appropriate
- materials development with attention to the special needs of the BVI, but not to the exclusion of the creation of visually stimulating materials and environments for the sighted learners and instructors
- discipline faculty preparation and support as they teach in these mediated instructional environments
- complete revision of student assessment and evaluation to a standards- and performance-based model
- creation of student and faculty support materials

Other issues that have surfaced are related to the administration and implementation of distance learning programs.

- faculty and student access to distance technologies is not yet ubiquitous; high quality, dedicated technical support is essential
- importance of strong administrative support from the College of Education Dean
- project management requirements were underestimated (timelines, coordination, collaboration)
- the degree program is complex due to state licensure requirements and this complexity is compounded when students participate from multiple states
- the participation of non-special education faculty requires additional time and design support
- other campus support systems (e.g., Academic Technology Services, Registrar, Scheduling) must be administrative partners in such large scale efforts
- facility design was required (WWW access stations; digital video development station; compressed video classroom, access to adaptive hardware and software)
- technical considerations at the development level and the end user level (e.g., website compatibility with screen readers, software versions, Web browsers and their configuration; software downloads) must be addressed simultaneously
- remote student access to registration, library resources, textbooks, advising, financial aid, and other support services in a university environment unprepared for these requests.

Delivery Systems and Media

The project purposefully employs a wide variety of distance delivery systems and media. In particular instances, materials are developed in more than one media to allow all students (sighted and non-sighted) access. Though not a stated objective of the project, an unintended consequence has been that the students are increasing their use of and comfort with technology, in general. All members of the project team believe in the power of technology to meet learner needs and in the importance of better preparing teachers to effectively utilize technology with their students. For these students who will teach children who are BVI, Hardman's (1999) comment strikes a loud chord, "A technologically competent work force in the education industry is needed to continue to keep the promise of universal education: to leave behind no child who is willing to try" (p. 4). The project relies on the WWW, compressed video (CV), text (student handbooks and coursepacks), videotape (custom and commercial), CD-ROM (custom), a required campus component during one summer, computer video conferencing, synchronous and asynchronous communication via the Web, audioconferencing, and commercial satellite downlinks.

The discipline faculty felt strongly that the distance delivered program should be as student-centered as the campus program. The design and development process has consistently incorporated Sorg and Truman's (1997) recommendations for creating quality student-centered virtual classes. Their recommendations included personalizing instruction, humanizing the course pages, providing advance organizers, and assuring easy navigation between and among course topics. During the grant period, the project website has undergone three substantial re-designs. Each one has brought us closer to the desired student-centered, interactive, facilitated distance learning environment that is our vision.

Though multiple media and distance systems are used to deliver this program, the WWW is the central learner and instructional resource for the redesign of each course (http://vision.unco.edu/). A standardized navigation shell was custom created so students do not feel "lost" each time they begin a new course in their program. Each course, however, relies to varying degree on the Web for the delivery of instruction. All courses have embedded syllabi, links to the four sets of discipline standards and course standards, course requirements, description of course activities, an asynchronous threaded discussion area, a synchronous discussion area, course schedule, and a place for additional resources that may or may not be web-based. Each course also has a dedicated class listserv. Some of the course websites include interactive custom-designed tutorials, samples of student projects, links to external assistive software, and multimedia authored graphics. The project website is not password protected, but all course sites are. The variety of technologies in use has increased as the discipline faculty has become more comfortable with trying new instructional strategies with remote students.

Remote students have access to several support systems that have proven invaluable to the satisfaction and success of the learners.

- online Graduate School admissions application
- student handbook for project participants (available in text and as a PDF file on the Web)
- toll-free phone into the Special Education Division office
- a Webmaster who responds to individual technical problems with near 24/7 response
- CD-ROM with web browser and style sheet options to load on home computers
- course enrollment and program enrollment listservs (subscribers include students, faculty, and the grant team)

Lessons Learned

- Facility design of distance education learning environments (DELEs) is expensive, time consuming, and requires substantial technical, pedagogical, and academic expertise related to distance delivery of instruction.
- ID and FD (facility design) need to evolve simultaneously for DELEs that utilize multiple delivery systems/media.
- Substantial advance planning and continual project management is critical to initiatives of this scope.
- Most of the distance delivery technologies today are visual technologies; consequently there is significant attention required to specialized design and development considerations for this project and for any other distance effort that strives for equal access for disabled learners.
- Faculty introduction to and training for using these technologies for instructional purposes is particularly important to project success, learner satisfaction, and continued faculty involvement.
- Meeting individual learner needs, faculty expectations, and content requirements are not mutually exclusive in the creation of a DELE, but the process is extremely complex.

Future Directions

Federal funding ends on December 31, 2000 and the staff have applied for additional funding to continue the project and keep up with changing technology. Our next steps include technical assistance regarding online course delivery to other universities with programs in visual impairment and blindness, as well as licensing of the courses for delivery at other universities. Discussions are also proceeding related to using this design and development effort as a model for other low incidence disability degree programs.

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BVI Resources

Bobby	http://www.cast.org/bobby/
EASI at Rochester Institute of Technology	http://www.rit.edu/~easi

"House of Style" CSS Tutorials	http://www.westciv.com/style_master/house/tutorials/index.html
IBM Accessibility Center	http://www-3.ibm.com/able/
Microsoft	http://www.microsoft.com/enable/
TRACE at University of Wisconsin-Madison	http://trace.wisc.edu/
World Wide Web Consortium's Web Accessibility Initiative (WAI)	http://www.w3c.org/WAI/
WWW Consortium's Synchronized Multimedia	http://www.w3.org/AudioVideo/
W3C Validation Section	http://www.w3.org/MarkUp/#validation